ILLUSTRATED
ELECTRICAL REVIEW
A Journal of Scientific and Electrical Progress.

VOL. 25. No. 14. WEEKLY. NEW YORK, WEDNESDAY, OCTOBER 3, 1894. $3 per Annum. Single Copies, 10 Cents.

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Entered at Post Office, New York, as Mail Matter of the Second Class.

VIEWS, NEWS AND INTERVIEWS.

The great scene in "The Tide of Life," which was at Niblo's Theater in New York city last week, takes place in the last act, when the villain, hotly pursued by the police, jumps from a window and is roasted to death on the electric wires. Mr. Tibbetts, who played the villain's part, maintains that this was the one original feature of the play and that it was his realistic exertions when suspended from the wires that gave "The Tide of Life" its one little touch of nature. At Niblo's it is the usual thing for the ghost to walk immediately after the Saturday matinee. Last Saturday the members of the company did not receive their salaries. Many of the actors struck and "supes" were put in their places. Tibbetts was still faithful. But he was only waiting to make a *coup d'etat*. All through the third act he pursued the errors of his rôle, but just before his suspended death scene he informed the stage manager that he'd see him further before he would die for him unless his salary was produced that moment. The stage manager at once rigged up a dummy, and, by attaching a wire to its right leg, he was enabled to personally conduct its death throes from behind the scenes. The dummy received a positive ovation.

Queen Victoria will use electricity for cooking purposes. The necessary apparatus has been installed at Osborne, in the Isle of Wight. It is, however, only used for the more delicate dishes.

A new carriage, built for the German Emperor, is provided with electric lamps. One is placed on the breast of each horse, on the point of the pole of the carriage, at the sides and at the rear of the vehicle. Thus distributed, they will make the route at night as light as at noonday for fifty paces from the equipage, while the vehicle itself, with its occupants, will remain in perfect darkness.

Gold and Stock Telegraph Company.

These directors were elected at the annual meeting of the Gold and Stock Telegraph Company on September 25: Thomas T. Eckert, John Van Horne, Howard Gould, Russell Sage, Charles A. Tinker, William A. Wheelock, George J. Gould, Edwin Langdon, J. B. Van Every and John T. Terry.

A BIRD'S-EYE VIEW OF NIAGARA FALLS.

INTERESTING DATA OF THIS TREMENDOUS WATER POWER.

Through the courtesy of Dr. F. P. Vandenbergh, of the Van Denbergh Laboratory of Chemical Industry, the ELECTRICAL REVIEW is enabled to present herewith a striking and instructive bird's-eye view of Niagara Falls. To Mr. William A. Brackenridge, resident engineer of the Cataract Construction Company, we are indebted for the following data concerning Niagara Falls:

Water surface of the Great Lakes (excepting Lake Ontario): 84,000 square miles. Water shed of same: 240,000 square miles—more than

BIRD'S-EYE VIEW OF NIAGARA FALLS, N. Y., SHOWING THE ELECTRIC POWER HOUSE, WHEEL PIT, SUBWAY AND TUNNEL IN SECTION.

twice the area of Great Britain and Ireland. Length of shore line: 5,000 miles. Volume of water: 6,000 cubic miles—of which Lake Superior contains a little less than one-half. Rate of out-flow at Buffalo: 217,000 to 275,000 cubic feet per second. Niagara Falls: 23 miles below Lake Erie and 14½ miles above Lake Ontario.

Fall: 165 feet—Depth of water just below falls, 189 feet (plus). The volume of water in the lakes is such that it has been estimated that, even if no rain fell, the flow of the river would be continued at its present rate for 100 years—if the lakes could be gradually drained. Such is the never failing reservoir from which the Niagara Falls Power Company proposed to draw its supply. The company has acquired 1,600 acres of land stretching to a point five miles easterly and three miles northerly from the Falls.

1,071 acres are intended to be devoted to mill-sites for manufactories. The Niagara Development Company—a sub-company to provide homes for the operatives—has purchased 340 acres of land, 83 acres of which are already improved by houses, stores, a school-house, streets, water, and a double system of sewers leading to the sewage disposal works.

The Niagara Junction Railway Company, another sub-company, owns 168 acres of land, and has completed a terminal railroad connecting the power company's lands with the existing railroads at Niagara Falls. The power company also has lands under water sufficient to provide an uninterrupted dockage front of 12,000 feet.

Some of the docks have already been built.

Total water power of the Falls: 7,000,000 horse-power.

Amount to be used: 125,000 horse-power.

The canal: "The main canal is protected against floating ice by having its entrance directed downstream, and by a floating boom fastened to iron piers at its mouth.

The canal is 1,300 feet long, 100 to 130 feet wide, and the depth of water will average 12 feet. The greatest velocity of flow in the canal will be 4.17 feet per second, when a sufficient amount is being fed to the turbines to produce 100,000 horse-power. From this inlet canal the water is led through steel penstocks to the turbines and is discharged into a channel at the bottom of the wheel-pit, from which it flows into the main tunnel and is returned to Niagara River at the portal just below the upper Suspension Bridge.

The wheel-pit (cut into the solid rock) is 178 feet deep, 21 feet wide and at present is 140 feet long. When it is continued to its full length as planned, it will provide for ten inlets and be about 400 feet long.

The work of construction was commenced by Rogers & Clement, of New York, the contractors, October 4, 1890.

The heading between the portal and shaft No. 1 met on December 24, 1891, and that between shafts No. 1 and No. 2 on February 3, 1892.

Eight hundred tons of dynamite (each consignment of which was assayed at the VanDenbergh Laboratory) was used in blasting for the tunnel, and 30 acres of land (for docks) were made with the material excavated.

The tunnel is lined throughout with vitrified brick—a total of over 13,000,000 being used.

The mills of the Niagara Falls Paper Company (the largest in the world) are being operated by hydraulic power from the inlet, and a concrete subway five feet six inches by three feet ten inches is ready for the wires, which are to supply 6,000 electrical horse-power to the Pittsburgh Reduction Works, and thence by poles to Buffalo.

Three turbines of 5,000 horse-power each are already in position, and the dynamos are nearly ready to be placed.

The tunnel is 7,250 feet long, 14 to 18 feet wide and 21 feet high. The grade is 36 feet to the mile, and the tunnel passes 200 feet under the city of Niagara Falls—as indicated in the illustration.

Ohio State Tramway Association.

This association met at the Boody House, Toledo, Wednesday, September 26. There was a very good attendance.

President A. E. Lang delivered his annual address as president at the morning session. The new companies admitted were: The Toledo Electric Street Railway Company, the Delaware Electric Street Railway Company and the Toledo and Perrysburg Railroad. The committee on topics for discussion reported the following subjects to be considered: A desirable and satisfactory fender or life guard. The best qualifications for conductors and motormen. The treatment of low joints and how to prevent them. The best methods of controlling employés and collecting fares. These were quite generally discussed. A banquet was tendered the association at the Toledo Club in the evening.

Officers for the ensuing year were elected as follows: President, W. F. Kelly, Columbus; vice-president, Reid Carpenter, Mansfield; secretary and treasurer, J. B. Hanna, Cleveland; chairman Executive Committee, Wm. A. Lynch, Mansfield.

Missed It By A Foot.

To the Editor of Electrical Review:

On page 138 of the Electrical Review is a curious slip to which I wish to call your attention. "Every *pound* of water power," should of course be "Every *foot-pound* of water power, etc." Very truly yours,

S. T. Moreland,
Department of Natural Philosophy,
Washington and Lee University,
Lexington, Virginia.
September 21, 1894.

Mr. J. G. McGuier, former secretary of the Columbus Electric Light and Power Company, has been compelled to resign on account of ill health, and is now sojourning at a sanitarium in the South, hoping to recuperate his strength. Mr. L. C. Newsom is now secretary and treasurer of the Columbus Electric Light and Power Company.

ELECTRIC RAILWAY HAPPENINGS.

WHAT IS GOING ON IN ALL PARTS OF THE COUNTRY IN THIS GREAT INDUSTRY.

OPENING OF NEW ELECTRIC ROADS AND THE CONSTRUCTION OF OTHERS IS THE ORDER OF THE DAY—A SAFE ROBBER, A POET AND A BROKEN GAS MAIN ADD TO THE INTEREST.

The electric line between Hartford and Unionville, Conn., is now open.

The steam dummy road at Columbus, Ga., will be changed to a trolley line.

An electric railway between Fort Riley and Junction City, Kas., will be built.

The construction of the electric railway at Danbury, Conn., has commenced.

Work has begun on the extension of the electric railway from Midway Park to Goshen, N. Y.

A new electric street railway has been successfully opened between the towns of Athol and Orange, Mass.

A bold but unsuccessful attempt to rob the safe of the Schenectady, N. Y., Street Railway Company was made on September 24.

Work on the new Hampden and Winterport, Me., electric railroad will commence as soon as the frost is out of the ground in the Spring.

Cars are running on the Shamokin-Mt. Carmel, Pa., electric road. It is expected the entire road will be finished and in operation within two months.

The Middletown and Madison, Ohio, Street railroad has been sold at receiver's sale. It was knocked off to Mrs. Ruth J. Caddington at her bid of $10,171.

C. S. Shaffner, lately with the Mobile Light and Railway Company, has been appointed superintendent of the Electric Lighting Company, of Mobile, Ala.

H. H. Vreeland, of New York city, is reported to have been engaged to take control of the financial end of the Consolidated Traction Company, of Newark, N. J.

Hon. Thomas J. Gargan, Boston's Transit Commissioner, arrived from Europe last week. He has been investigating rapid transit abroad and thinks Berlin has the best system.

President Brown, of the Baltimore Traction Company, has given a contract to the White-Crosby company, of Baltimore, for the new tracks on Fayette street, and work upon them will begin at once.

It is said that the tax rate at Bridgeport, Conn., will be raised from four to six mills in order to put the streets in proper shape after the tracks of the Bridgeport Traction Company are laid.

Another new Ohio electric railway is to be constructed. It will connect Manchester and Winchester—a distance of 25 miles, and a contract to build and equip the road has been made, the cost to be $200,000.

The local subscriptions to the new electric railway project at Waukesha, Wis., have reached the amount of $26,500, and the close of the week will doubtless see the amount increased to $30,000.

The office of assistant superintendent of the Consolidated Street Railway Company, of Cincinnati, which has been held for some time past by J. Dexter Harris, a son of Superintendent John Harris, has been abolished.

Messrs. Wareham and Hughes, of Beaver Falls, Pa., have contracted for $20,000 to build in six months the Benwood (W. Va.) and Southern Electric Railway to extend from Benwood to Moundsville, W. Va., a distance of 15 miles.

Not a street car on Knoxville's (Tenn.) 10 lines of electric street railway was moving on September 22. A large pulley in the power house, which propels the entire machinery, was broken, and it will be a week before the accident can be repaired.

The electric railway from Natick to Newton Lower Falls, Mass., is now considered an assured fact, nearly one-half of the proposed stock having now been subscribed for, the stockholders being prominent business men and capitalists of Natick, Wellesley and Boston.

A Brooklyn, N. Y., trolley car ran across an opening in the street where workmen were repairing a leaky gas main. The brushes on the motor must have sparked for there was an explosion which shook the car up badly. The lighted gas set fire to the car. Another instance of the danger of the deadly gas main.

One "G. W. N." breaks into rhyme in the columns of the Kalamazoo *Gazette* about the employees of the electric railway of that city. It must have made the wheels tired, and concludes as follows:

The Citizens' street railway by these folks run;
It includes all the names with the exception of one;
And here is that one, and I think that it will end it;
There is E. E. Downs to superintend it.

The new power house for the Bridgeport Traction Company at Bridgeport, Conn., consisting of a dynamo room and a boiler room, will be of iron and brick, composite construction, designed and built by the Berlin Iron Bridge Company, of East Berlin, Conn. The dynamo room will be controlled by a traveling crane, furnished by the same parties.

The wealthy citizens of Fairfield do not want the trolley. They don't need it. They have carriages. But it is not the wealthy of any town or city who need street cars. The workingmen are the persons who use the trolley. They are benefited more than the wealthy are inconvenienced. Fairfield's work people should rise up and demand the trolley car.—*Bridgeport, Conn., Union.*

Electric Lighting Effects at the G. A. R. Encampment at Pittsburgh.

If there has been any doubt in the mind of anybody that electric lights as features of decorative illumination have supplanted the gas jet and the vari-colored tallow or wax candle of "ye olden time," this fact was abundantly demonstrated during the G. A. R. encampment recently held in Pittsburgh. While the people of the "Gas City" might have blown off the natural fuel in flaming profusion without missing it, it was generally noticed that arc and incandescent lamps with globes of red, white and blue had a monopoly of the decorations; in fact, nothing else was used. It has been stated in the daily press throughout the country that the Pittsburgh encampment was the grandest ever held since the organization of the G. A. R., and if that is true the electric light illumination deserves a good deal of credit for it, because it is safe to assert that never has been made a public demonstration in which there were so many lamps used for the purpose of decoration. Not a public building, not a business house, not a store, large or small, was to be found in the entire down-town portion of the city which during the evening did not present an aspect of glaring incandescent brilliancy. The Alleghany County Light Company, with its capacity of 75,000 lights, the East End Electric Light Company, with its 40,000 lights, and the 225 isolated plants with a total of 300,000 lights, were all called into

MR. W. R. THOMPSON, ARTIST-ELECTRICIAN.

requisition, and the stereotyped newspaper expression a "sea of light" was never more appropriately used than in the description of these illuminations.

Owing to the grandeur of these decorations of electric lights it may be interesting to give the details of some of them. The County Court House, where an isolated plant of 4,000 lights is operated, had a number of decorations on the tower, the Grand Army badge in red, white and blue lights being the most conspicuous. The Pittsburgh Press Club had the front of its building covered in rows of Westinghouse stopper lamps, the current for which was furnished by the Alleghany County Light Company. On the roof of the eight-story *Times* building were two sets of electric decorations in the shape of the word TIMES, all composed of incandescent lamps. Lettering in the form of "Welcome, G. A. R.," "Welcome, Comrades," and "Washington," "Lincoln," "Grant," etc., was found in great profusion along the principal thoroughfares. At the great reception given in honor of the G. A. R. men by the local committee in the new works of the Westinghouse Electric and Manufacturing Company at Brinton, over 1,000 incandescent lamps and 250 arc lamps were used, and these immense buildings painted in white presented a truly fairy-land appearance.

One of the most artistic and complete pieces of electrical decoration was to be seen on the Horne building, which in every detail was carried out so thoroughly as to create quite a sensation on the first night it was lit up. Being the idea of Mr. W. R. Thompson, the well-known electrician of the Joseph Horne Company, who on similar occasions succeeded in producing electrical effects on the Horne building that proved rare revelations, the ELECTRICAL REVIEW has gone to the trouble of getting some photographs of the decorations, as well as one of Mr. Thompson.

The Horne building is one of the finest business structures in Pittsburgh, being six stories high and having a floor space of 200 feet square. In the front of the building was a large painting 25 feet square, representing "Sheridan's Ride," which was surrounded by a frame of colored incandescent lights. On the third floor front was another illumination sign, "Welcome, G. A. R.," also composed of incandescent lights. This latter illumination was so controlled that the letters could be lit gradually and turned out again the same way. The effect of this was very attractive, and during the evening crowds were constantly congregated in front of the building to see these lights. It was on the roof, however, where Mr. Thompson succeeded in obtaining the most brilliant results. Here he built a frame fence around the entire building and then attached 66 arc lights. These lights were covered with red, white or blue globes, which alternated around the entire structure. They were operated by one of the new Westinghouse series arc light dynamos, which had been installed for this purpose. On one side of the roof was the largest "G. A. R." badge that has probably ever been made, all composed of incandescent lamps.

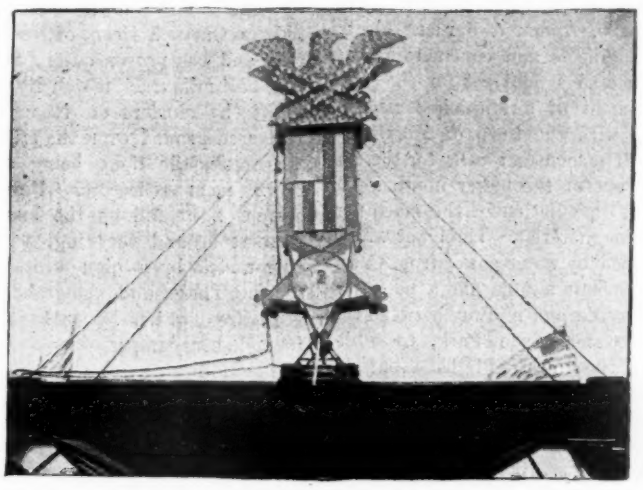

FIG. 1.—ELECTRIC LIGHT G. A. R. DECORATIONS AT PITTSBURGH.

The badge was, in reality, a box with sides of colored glass. Inside were six high tension arc lights, while the badge itself was made of five hundred 16 candle-power Westinghouse stopper lamps. The effect of this illumination at night cannot be imagined, and to fully appreciate it, it had to be seen. Mr. Thompson received many complimentary remarks and congratulations for his decorations.

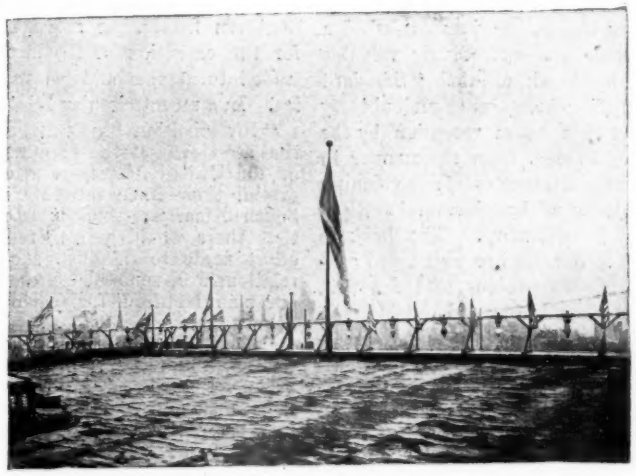

FIG. 2.—ELECTRIC LIGHT G. A. R. ILLUMINATION AT PITTSBURGH.

Not Quite Ready to Run Railroads by Water and Electricity.

With reference to the rumor regarding the running of Canadian Pacific Railway trains out West by electric power obtained from the water streams in the Rocky Mountains, Sir William Vanhorne recently said: "The scheme has been suggested. There is no doubt that it could be done. The only question of any importance is this: Can we put out the necessary capital for the works and expect proper returns by way of interest? We are considering that question, but rather each director for himself than as a board. For myself, I do not mind saying at once that I do not see that the scheme is financially practicable, certainly not at present."

A New Transformer.

One of the important agencies that the Metropolitan Electric Company, of Chicago, list is the Royal transformer. These transformers are being made especially for the Metropolitan company. As soon as possible they will carry a full stock. They are now booking orders and have found a ready demand for this transformer in all sections of the country.

To Atlanta via Norfolk and Western.

Mr. L. J. Ellis, of the above road, announces that the special train on the Royal Blue will leave New York at 3 P. M. Monday, October 15, and arrive at Atlanta at 6 P. M. Tuesday. Among the gentlemen going over this route are Major H. C. Evans and party, L. J. Perrine, Benj. Norton, J. B. Griffith. This road runs via Chattanooga, where the delegates expect to stop on their return.

To Atlanta via Pennsylvania and Southern Railways.

The Southern Railway Company's passenger agent in New York makes the following announcement concerning the Atlanta special that leaves New York October 15 at 4.30 P. M. on the Pennsylvania: "Already five Pullman sleeping cars are filled, and the attendance from the East will be larger than at any other meeting heretofore held. Most of the New England and Eastern representatives are going via the Southern Railway, Piedmont Air Line, as it is 14 hours quicker than via Chattanooga to Atlanta, and this gives you choice of going and returning different routes. Among the number who go via this line are representatives from the large manufacturing establishments of Lewis & Fowler company, H. W. Johns company, Portland Shade Manufacturing Company and the Okonite company, representatives of the ELECTRICAL REVIEW, *Street Railway Gazette*, etc., and a large number of other representatives of leading houses."

The injunction suit brought by several prominent citizens to restrain the Common Council of Kalamazoo, Mich., from making a contract for the erection of an electric lighting plant, and from buying land for the site of a plant without a two-thirds vote of the Common Council, is likely to be bitterly contested.

OUR BOSTON LETTER.

The Pettingell-Andrews company have secured the sole United States agency for Dick, Kerr & Company, of England, manufacturers of steel and iron rails for street railway use. Under the able management of Mr. F. X. Cicott this department of the Pettingell-Andrews company's business is developing rapidly.

The Beacon Vacuum Pump and Electric Company are feeling the stimulus of Fall trade to an unusual extent, and are finding themselves pushed even with their increased facilities to get orders out on time. Their factory is running full force and on full time and a general air of bustle pervades the premises, which is encouraging to note.

Westinghouse, Church, Kerr & Company of this city have just closed one of the star contracts for which they are noted, by which they are to furnish the entire equipment of the new plant of the Citizens' Electric Light and Power Company, of St. Henrie, in the Province of Quebec. The contract covers everything but the building itself, and even this is constructed on plans furnished by them. The equipment consists of direct-connected engines of about 200 horse-power each, Westinghouse apparatus, Manning vertical tubular boilers, economizers, mechanical draft and all other supplies, and will aggregate many thousands of dollars. Foundations are now being laid for the heavy machinery, and when completed the station will generate over 1,000 horse-power.

Mr. H. C. Cushing, Jr., electrical inspector of the Boston Board of Fire Underwriters and Boston Fire Underwriters' Union, has just published a handsome and exceedingly valuable little handbook entitled "Standard Wiring," which will undoubtedly meet with a warm reception by the trade. Indeed, from the manner in which the advance orders are coming in, it looks as though several editions would be necessary. The book is 4½x6 inches, leather cover, and contains 20 illustrations of the newest methods of inside and outside construction for alternating and direct-current wiring, together with all necessary tables, rules and formulas as approved by the insurance inspectors throughout the country. It is gotten out chiefly for the benefit of central station superintendents, constructing engineers and architects, and has been adopted as a standard by the Fort Wayne, General Electric and Mather companies for use by their men.

The work of putting the wires under ground in this city is progressing nicely, and great headway has been made in this respect during the past few weeks. The West End company have decided to put their feed wires into conduits, and this work will be rushed in the business section as fast as possible. The New England Telegraph and Telephone Company are also in line, as is the Western Union. These companies will both abandon part of their present system and make the necessary connections through their new conduits. The automatic fire alarm companies propose to apply for permission to run their wires through the firm department conduits, and if not successful in this, will arrange with some of the smaller companies to share one conduit together. From the manner in which the work is progressing at the present time it looks as though January 1 would see a vast improvement in the appearance of Boston's streets.

Messrs. Almon & Sargent, electrical engineers and contractors, have just closed a contract for the entire equipment of a municipal lighting plant with the town of Morrisville, Vt. The contract calls for the construction of the power house as well as the installation of the machinery and line material. The plant will be operated by water-power from Cady's Falls, about a mile and a half from Morrisville and midway between that village and Hyde Park, to which place the lines will be eventually extended. General Electric Company's apparatus will be used, and one 60 kilowatt alternator and one 30 light arc machine will be put in as soon as the power house is completed; 275 horse-power can be developed from the falls, and the plant will be extended as the necessity demands. About 15 miles of wire will be used in running the poles, which are to be 40 feet high and set at the intersection of the principal streets. They will also be equipped with Wing's hanging appliances for raising and lowering.

H. G. T.

Boston, September 29.

To Extend the Machinery Trade.

Dixie, a valuable publication devoted to the development of the Southern States, has evolved a plan for the extension of the machinery trade into Mexico and South America. In a recent circular *Dixie* says:

"Investigation has convinced us that a majority of the manufacturers of the United States are anxious to extend their trade into Mexico and South America. And it is evident that there would be a more general effort made to establish such trade relations were some plan presented to our manufacturers for reaching the buyers of these countries.

"To inaugurate this work of extending the trade of our manufacturers, we suggest an exposition to be held in the City of Mexico during the months of January, February and March, 1896 or 1897, as may seem best after thorough consideration. If held during the months suggested, the exposition would attract a tremendous patronage of Winter tourists from the United States This, in itself, would be a strong inducement to the Mexican Government, as their resources would thus be exhibited to the capitalistic class of the United States. On account of its accessibility, we think Mexico affords the best location for the first of these expositions. Besides this, the manufacturers of the United States already have considerable trade in Mexico, and this trade would be stimulated and given greater scope. Expositions in the South American republics could follow at such periods as seemed advisable."

The Boston, Mass., Electric Light Company paid a dividend of $2 per share on September 29.

RACING BY THE ELECTRIC LIGHT.

HOW ELECTRICITY HELPS OUT THE RACE TRACK DEVOTEES AT MASPETH, L. I.

The Newtown Jockey Club is the owner of a race track at Maspeth, Long Island, where the lovers of this sport can go, day or night, and be entertained—thanks to the electric light. This installation was put in by the well-known contractors, Messrs. Curtis & Dean, of New York city, and has proven quite a success. The half mile track is well lighted at night by clusters of incandescent lamps suspended over the middle of the track, the light being thrown down from reflectors. Besides a search light follows the bunch of runners around the ring, which is surrounded by a high white board fence. The grounds and grand stand, etc., are lighted by both arc and incandescent lamps.

The following interesting data is given as this is the first installation of the kind in this part of the country. There is another at East St. Louis.

There are two 115 horse-power engines, two new boilers, two Edison type 100 kilowatt generators, 200 clusters of four 32 candle-power lamps each over the track; about one hundred 32 candle-power lamps scattered about the entrances, betting ring, offices, etc.; about fifty 16 candle-power lamps; 28 arc lamps and three 6,000 candle-power search lights. During the race the load is 1,050 amperes at 135 volts. The track is wired in three sections and these sections in turn are wired so that if one machine were cut out, alternate clusters of lamps would burn, so that the chances of the track being in total darkness are reduced that much.

Tests taken one morning after 12 hours of soaking rain showed a variation between the most distant lamps and those nearest to the station of less than three volts. This variation will be modified as soon as they can balance one of the circuits a little more evenly.

The jockeys, nearly all of whom were interviewed personally, say that there is plenty of light, and that they feel perfectly comfortable in pursuing their nightly vocation. The best proof of this is that there has been no accident, no interference, no swerving to amount to anything, and that the public is pleased. The association also expresses itself as well satisfied.

A Motorman Convicted of Manslaughter.

Michael Lewis, a motorman on the South Orange line, who run over and killed Martha Henry, on August 4 last, was sentenced at Newark, N. J., on September 24, to one year in the penitentiary for manslaughter. The judge, in his remarks when he passed sentence upon the prisoner, called attention to the alarming frequency of the trolley accidents and said that he would be compelled to make an example of the prisoner, who had been clearly convicted of a careless handling of his car at the time of the accident.

The Michigan Street Railway Association.

The Michigan Street Railway Association held its first annual meeting at Grand Rapids. Papers were read on "Suburban Electric Railways and Their Possibilities," by C. M. Swift, of Detroit; "Construction, Maintenance and Operation of Small Street Railways," by W. Worth Bean, of St. Joseph; "Street Railway Accident and Fire Insurance," by D. D. Erwin, of Muskegon. The local street railway company gave the visitors a banquet in its pavilion. The next meeting will be held at Grand Rapids, in September, 1895.

The following officers were elected: President, W. L. Jenks, Port Huron; vice-president, W. Worth Bean, St. Joseph; secretary and treasurer, B. S. Hanchett, Jr., Grand Rapids. The Executive Committee is composed of the officers and D. H. Jerome, Saginaw, and S. Hendric, Detroit.

The Incandescent Lamp as a Nerve Disturber.

A strong wind had set in from the sea, banking huge masses of clouds over the city, says a writer in the *Atlanta Constitution*. The rain descended in a blinding, staggering deluge and solid sheets of fire flashed athwart the angry skies, followed by crashing peals of thunder. The gloom was excessive. The lights in the streets cast a fitful, sickly glare over the wet pavements and a few belated pedestrians who were hastening home. It was a night for dark thoughts and darker deeds.

I laid aside the book which I had been reading—an absurdly impossible tale of midnight horrors and ghastly crimes—and sat moodily looking at the raindrops chasing madly down the window pane and at the fierce night without. The cabbies in the street below were swearing and the call bells in the hotels were clanging like wild.

Suddenly in the adjoining room I heard a sharp click like the cocking of a firearm. The connecting door was unbolted and slightly ajar. I sat still, with bated breath and hair bristling all over with terror. A shuffling of heavy feet and a muttered imprecation as something fell on the floor. A cold, paralyzing dread seized on me, freezing the blood in my veins. God of heaven! what horrible tragedy was being enacted behind that door!

Sharp, clear and loud, above the raging of the elements, rang out the report of a pistol, followed by a terrible oath and a heavy fall. Pale as a specter, I sprang tottering toward the door to escape, and, with a horrified scream, fell crashing to the floor in a dead swoon.

I awoke with a start. The connecting door was wide open. Above my prostrate form stood a rough-looking man in his shirt sleeves. His right hand was bloody. I seemed to feel his clutches on my throat already, and closed my eyes with a gasp. I opened them again, cautiously. In his bloody grasp he held the shattered remains of an electric light globe.

"Sorry, stranger," he said, "but I tried to open the durned thing to light up, an' hit busted."

The Ball Engine Company's New Vertical Engine.

In the design of this engine the Ball Engine Company, of Erie, Pa., taking advantage of their large experience of engine driving in electric stations, have tried to place themselves in the position of station owners and operators.

It was desired to arrange an engine whose structure should be of such a form that the main pieces should be absolutely rigid and indestructible, and while having this feature allow ease of access for adjustment or removal of any part that is subject to wear, and while covering these points, to produce an engine whose steam distribution is symmetrical on both sides of all the pistons, whether one, two, three, or four are used; in other words, an independent valve motion for each cylinder employed, and each of these being a perfect engine in itself.

By reference to the illustration it will be seen that the main proposition as to strength and indestructibility is fully covered in the symmetrical form of the upright housings which are made to constitute one double housing by having one side of each planed and bolted together in the center of the middle shaft bearing. This substantially is still further increased by the operation of planing the bottom of both housings to one continuous flat surface to meet the planed surface of the top of the single base plate to which the bottoms of the housings are bolted.

The shaft is of one piece of forged steel, the crank pins being 180 degrees apart and cut out of a solid down to their round diameter, and, as are the journals, ground to a perfectly round smooth running surface. The pins are provided with centrifugal oiling holes in addition to the regular supply through the usual tube reaching from the upper to the lower end of connecting rod.

Covering each pair of crank bells is a pair of disks carrying a sufficient amount of counter weight to give a perfect running balance to the cranks and the reciprocating parts, so that there is practically no vibration to be communicated to the housings and hence to the upper works of the engine.

The connecting rods are of forged steel, the upper end being solid and cut out for the reception of the brass cross-head box and the removable cross-head pin—the latter being very carefully tapered through the cross-head and held in place by a fine threaded nut, the lower end being provided with an excellent design of strap which, owing to the arrangement of the bolts and cross-keys, constitutes a solid end rod for the crank as well as the upper end, and both ends are provided with the very best arrangement of wedge adjustment that can be conceived of, and which in operation does not alter the length of the rod.

The cross-heads are of the double plate pocket type, as used in many makes of Corliss engines, are provided with taper shoes to compensate for any wear that may occur against the guides—the shoes being of cast-iron, with the running surface entirely covered with babbitt metal, the area of which has been made exceedingly liberal.

The piston rods are of crucible steel screwed into the cross-head. The stuffing boxes are adapted for the use of fibrous packing, unless otherwise ordered.

The pistons are of the double plate type, held up to a solid collar and tapered by a well-fitted nut. The piston packing is made up of two self-adjusting parting rings and a broad junk ring for centering and guiding the piston in the cylinder.

The cylinders are made of charcoal iron mixed in such a proportion of hard and soft as to produce a very strong, close-grained iron, which enables the surfaces to take a mirror polish. They are provided with single valves, each of which is practically one piece, so far as the motion and wear are concerned.

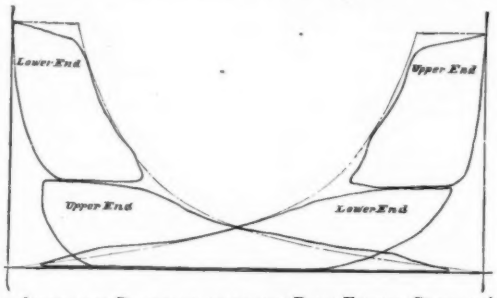

FIG. 2.—INDICATOR DIAGRAMS FROM THE BALL ENGINE COMPANY'S NEW VERTICAL ENGINE.

The high pressure valve is of the double faced telescopic relief type, with boiler pressure on the inside and a sufficient amount of unbalanced area being left on the faces that the force of the steam on the inside forces the two faces apart, causing each to rub against the seat with sufficient force to keep the surfaces polished and steam tight throughout the entire life of the engine.

The low pressure valve is of the common letter D type with improved proportion and construction, is provided with a round relief area upon its back operating against the chest cover, thus having a large well proportioned valve that runs with the greatest ease and yet follows up its wear without attention from the outside.

The engine here described is employed in electric railroad driving and is supplied with steam at 125 pounds gauge pressure and exhausts into a practically uniform vacuum of 24 inches, and was driving (at the time this test for total variation from standard speed was made) 425 to 435 indicated horse-power. To observe the variation a tachometer was attached to the main shaft. When all was in readiness and the full load was on, the switch controlling the whole current leaving the station was opened, thus dropping the entire load instantly, and the engine made a momentary flutter up to 235 revolutions and back again to 233 revolutions. The circuit was kept open while the attendant counted ten and was closed as suddenly as it had previously been opened, when the tachometer showed the engine making the same momentary flutter down to 231 revolutions and back again to 233, taking up instantly a load of about 400 indicated horse-power.

The test demonstrated that the governor was in absolutely isochronous adjustment, that the valves were absolutely steam tight and that this degree of control over an engine of this magnitude, using such a pressure and discharging into a vacuum, was all that could be desired.

This engine is guaranteed not to vary in speed from full load to no load, and *vice versa*, more than one per cent, hence, as the test showed but eighty-six one-hundredths of one per cent, it was conceded that the guarantee was fulfilled in very good form.

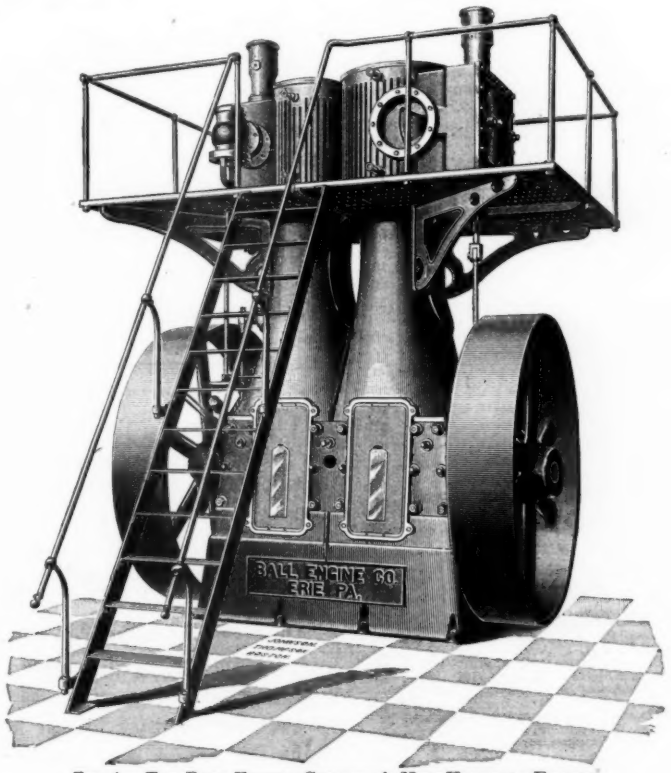

FIG. 1.—THE BALL ENGINE COMPANY'S NEW VERTICAL ENGINE.

Rapid Transit For New York.

The new Board of Rapid Transit Commissioners of New York city has adopted in full the plans of the old board. At a meeting on September 25 formal resolutions were adopted providing that the question of municipal construction be submitted to the people at the coming election, and requesting the Police Board to prepare the necessary ballots.

ELECTRIC LIGHT FLASHES.

Hamilton, N. Y., has voted in favor of electric lights.

The Philadelphia Edison Electric Light Company paid a two per cent dividend on September 29.

Rain has so delayed the work of stringing the electric light wires that the plant at Palmyra, N. Y., will not be in operation much before October 5.

Philadelphia has 4,820 electric street lights. New York city has about 1,300. That's all right. Philadelphia people are slower to see things and consequently need more light than New Yorkers.

After a delay of eight months the Western Electric Light Company, of Toledo, Ohio, has finally capitulated and handed in its acceptance under the ordinance passed January 15 to furnish Toledo with light for two years at $90 per lamp.

The fire that broke out on September 23 in the dock of the Pacific Coast Elevator Company at Portland, Ore., burned for three hours, destroying property valued more than $1,000,000. The new plant of the Portland General Electric Company, which had just arrived from Lynn, Mass., was standing in the yards of the Terminal company on the cars, not having been unloaded. The plant occupied an entire train. Most of the apparatus was destroyed and the remainder badly damaged. The loss was about $50,000.

The New York and Brooklyn Bridge trustees have definitely decided to abandon oil lamps for electric lights on the bridge cable cars. Bids were received and opened on September 27. That from the General Electric Company engaged to furnish the apparatus to light 60 cars, each with 10 lamps of 16 candle-power, for $14,200, the cost of running the same to be $4,905.60 a year. The bid of the Electrical and Mechanical Trading Company was $17,634 for the apparatus and $3,409 annnual cost of running. The Pintsch Gas Company's bid was $14,707 for the apparatus and $5,764 running expense.

Messrs. A. E. Young and C. J. Bastendorff are installing a first-class and very complete central station plant at Avon, N. Y. They have received a five-year contract from the town for 25 lights, have their power house, which is built of stone and is absolutely fire-proof, about completed, have their poles on the ground and have closed their order with Mr. Adams, of the Phillips Insulated Wire Company, for wire. They gave Mr. W. J. Morrison, New York State agent for the Fort Wayne Electric Corporation, an order for a 1,000 light alternator and a 35 light "Wood" arc dynamo, including all equipment, such as double "Wood" arc lamps, transformers, etc. Mr. Young is an experienced electrical engineer, having recently installed the plant at LeRoy, N. Y., and has been connected with the construction of electrical plants for a number of years. Mr. Bastendorff is furnishing about $10,000 capital for the enterprise.

ELECTRICAL REVIEW

Published at 13 Park Row,
P. O. Box 2339. NEW YORK.

EDITOR:
CHARLES W. PRICE.
ASSOCIATE EDITOR:
STEPHEN L. COLES.

REGISTERED CABLE ADDRESS:
"ELECTVIEW," NEW YORK.
1546 "CORTLANDT," TELEPHONE CALL.

BOSTON OFFICE:
H. G. TUCKERMAN, Room 29, 620 Atlantic Ave.
WASHINGTON OFFICE:
GEO. C. MAYNARD, 800 H St., N. W.

ADVERTISING DEPARTMENT,
H. T. RICHARDS, Manager.

SUBSCRIPTION TO THE
ELECTRICAL REVIEW.

One Year, United States and Canada, - $3.00
One Year, Foreign Countries, - - 5.00
Single Copy, - - - - - - - - .10
Back Copies, each, - - - - - - .25

NEW YORK, OCT. 3, 1894.

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Yes, business is reviving. Slow but steady, and pretty generally along the entire line.

An advertisement in a Boston paper announces that an expert engineer has favorably tested a system which "produces 27 electric lights from absolutely nothing." Why 27 only?

Is a cure for the awful cancer to be found in the electric current? A paper presented before the American Electric Therapeutic Association, which is published in abstract elsewhere in this issue, points in that direction.

There is a sort of dog in the manger attitude on the part of the owners of the Brush storage battery patents. Instead of apparently fighting to keep down improvement on the part of others in this important branch of electrical work, they should go to work, develop these batteries and benefit the public.

The Brooklyn Bridge management are to be congratulated on their decision to adopt the electric light to replace the bad-smelling oil lamps. Mayor Schieren's advocacy of the electric light has finally won. The management should also be congratulated on placing this important electrical work in the hands of so capable and reliable an electrical engineer as Mr. J. H. Vail.

It is expected that the movement of the B. & O. R. R. trains in the Baltimore tunnel by electric locomotives will be commenced about December 15. The power house is about half finished and is being rapidly pushed to completion. The tunnel is about 8,000 feet long and is double tracked. Three electric locomotives will be used, two to move trains in both directions in the tunnel and one for reserve or emergency work. Steam railroad men all over the country are awaiting with interest the result of this experiment which gives every promise of being successful.

NEW TROLLEY CAR "DANGER."

A spark from a Brooklyn trolley car wheel ignited a stream of gas escaping from a broken pipe in the torn-up street beneath. The flames spurted up on each side of the car, and the passengers thought —— had broken loose.

The brave motorneer, with remarkable presence of mind, according to the Brooklyn press, came to the rescue and permitted his car to go right on instead of stopping and waiting for the passengers to be burned! We wish to commend this man. One with less intelligence, on a cold day, might have stopped to warm himself and been consumed along with the passengers by the roaring, stinking, fiery gas.

In the language of the disingenious *Standard-Union*, thus "does a new trolley car danger appear."

DOES THE "FEEDER AND MAIN" DECISION AFFECT THE BERLINER CASE?

TO THE EDITOR OF ELECTRICAL REVIEW:

Commenting upon the recent decision of the United States Court at Philadelphia against the General Electric Company, the Court held that "the patent deals with the one particular difficulty of drop in tension or fall of pressure," etc., etc.

Will not this decision hold good in the Berliner suit—United States Government vs. the American Bell Telephone Company—a suit to annul the Berliner patent which covers variation of pressure only? What is the difference between the two cases?

Respectfully yours,
TELEPHONE.

Boston, Sept. 26, 1894.

We do not see that the quotation from the Court's decision would have any special bearing on the Berliner matter. The critical point of the decision was not the fact that the patent dealt with one particular difficulty, but that the one particular difficulty which was dealt with was one already familiar to electricians, the Court holding that after the high resistance lamp had been perfected it was a matter of simple electrical engineering to proportion the system so that the several lamps would be supplied with current of practically uniform voltage. In the Berliner case, it is claimed that Berliner was the first to propose the use of a variable pressure to vary the resistance in a telephone circuit, and if it proved to be a fact that this was new at the date of Berliner's invention, the patentability of the idea would not be affected by the fact that the idea was unitary. There are other grounds upon which the Berliner patent has been attacked which are very serious. The Supreme Court of the United States has recently held that the publication of an idea in a prior patent will invalidate a subsequent patent claiming the same idea. This was decided in the case Miller vs. Eagle. The Berliner patent, which has assumed so much importance, covers a method of transmitting speech by variation of pressure between electrodes in constant contact. This same idea was described in a prior patent taken out by him for a receiver 12 or 14 years ago. It has been pertinently observed that the only difference between the broad Berliner patent and the one taken out so many years ago is in the *use* of the instrument; that is, is one case the instrument is held to the ear and in the other to the mouth. Whether the Court will sustain such a distinction irrespective of the precedent established in the case of Miller vs. Eagle, above referred to, is also a matter of doubt.

PERSONAL.

Mr. W. B. Cleveland, of Cleveland, O., spent a few days in the metropolis this week.

Mr. W. C. McKinlock, secretary of the Metropolitan Electric Company, Chicago, is out of the city on important business connected with his company.

Mr. Geo. A. McKinlock, president of the Central Electric Company, Chicago, is spending the week in New York, accompanied by Mrs. McKinlock.

Professor W. A. Anthony, formerly of Cornell University, has been appointed to the chair of elementary and advanced physics at the Cooper Union, New York city. The lectures will commence October 3.

Mr. Frederick Swift, well known in electric light and electric railway circles of Boston and New York, has moved his offices to 47 Cedar street, New York. Mr. Swift is one of the receivers of the Cleveland, Canton and Southern Railroad, and besides has large electrical interests.

Mr. Charles S. Gleed, attorney of the Missouri and Kansas Telephone Company, has been elected director of the Atchison, Topeka and Santa Fe Railroad. Mr. Gleed is one of the clear-brained young men of the day, in every way worthy of the confidence of the large interests he is thus called upon to represent.

Mr. J. I. Beggs, of Cincinnati, was a New York visitor last week. Electric lighting in his city is booming, and recently he purchased eight Armington & Sims engines, rating from 200 to 400 horse-power each. Mr. Beggs is an active personality and is evidently developing Cincinnati's lighting business.

W. A. Stadelman, the active and more or less good-looking representative of the Niles Tool Works, of Hamilton, O., and also the general manager of the Bristol, Tenn., Belt Line Railway, was a New York visitor last week, and proved to be a prophet of good times coming and already here. Mr. Stadelman is a great traveler and speaks several languages without prevarication.

Mr. William Hazelton, 3d, general eastern agent of the Fulton Truck and Foundry Company, with offices in the Havemeyer building, New York, has just returned from a six weeks' trip, combining business with pleasure, in Nova Scotia. This company are large manufacturers of motor trucks and steam and street railway supplies generally, and will be represented by Mr. Hazelton at the coming Atlanta convention.

Did your ever see Sandow lift a heavy weight? Notice how he got a good grip, planted himself firmly, took a deep breath and then lifted? See the weight slowly and surely go up? Well, that's just the way business is responding to commercial demand these days. It's not going to go up with a jerk, only to fall back and hurt itself and the demand. It's going up slowly and surely because it's forced by legitimate causes.

Electric Lights Reduce Crime.

When Henry W. Jaehne, afterward convicted of complicity in the boodle payments by the Broadway railroad managers, but since restored to the rights of citizenship by Governor Flower, was alderman from the Fifth district, he introduced and had adopted an ordinance which provided for the lighting of West street by electric light, says the New York *Sun*. One early and good effect of this innovation was that the neighborhood, which had previously been the resort of river thieves, footpads and miscellaneous criminals after the hours of nightfall, was much improved, and robberies ceased to be of frequent occurrence.

The neighborhood is one much frequented by market men, Clinton Market being at the foot of Spring street, and Gansevoort Market further north on the same side of town. Many persons are obliged, by the demands of business, to traverse this portion of the west side late at night, and some of them find it necessary or desirable to carry with them considerable sums of money. The records of the Prince street station show, or rather did show until the station house was removed to Macdougal street, that following the introduction of these electric lights, robberies, previously numerous, diminished rapidly in this locality.

Since then electric lighting has become pretty general in the streets of New York. Broadway, the Bowery, Eighth avenue, Third avenue, Fourteenth street, Grand street, Park Row, One Hundred and Twenty-fifth street and other thoroughfares are now almost as well lighted by night as by day.

During the time that flickering gas lamps were depended upon for the illumination of the streets of New York, persons traveling about at a late hour had very little protection from assault, as it was not possible for policemen, however faithful and diligent, to cover all posts. It was always in the power of thieves to "turn out the gas," thereby leaving a street in temporary darkness, and subjecting always a belated pedestrian to the liability of sudden and unexpected assault.

In the year 1884 there were 316 arrests—or one for every working day on the average—for street robbery in New York city. In 1885 the number increased to 332. Then the improvement in illumination came into effect, and in the year following the number of arrests for robbery was only 291. In 1888 it had fallen to 270. In 1890 it was 253. In 1892 it was 239, and last year the total number of arrests for robbery was only 232, showing the close connection between the diffusion of electric lights and the suppression of this form of felonious crime.

During the years succeeding 1884, the population of the city has been steadily increasing, of course. If, therefore, the number of robberies committed in each year had remained precisely at the same figure, the ratio of robberies to the population would have steadily decreased, but there has been a double reduction, for there are now fewer robberies than there were ten years ago in New York city, and the population has greatly increased during that time.

By the last report of the Commissioner of Public Works it appears that the city is paying for the lighting of 27,500 lamps, about 2,000 (mostly in the big thoroughfares) electric and the remainder ordinary gas lamps still in use on the side streets. The item of gas and electric lighting costs the city in a year about $900,000.

ELECTRICAL CONSTRUCTION.

The Minneapolis, Minn., General Electric Company will build a new plant to cost $200,000. Both steam and water power will be used.

The Natick and Cochituate, Mass., Electric Street Railway Company is making an effort to sell stock to create a fund to build the extension contemplated through the Wellesleys. It is reported that $20,000 of the necessary $70,000 has been subscribed.

The organization of a new electric light and power company at Pensacola, Fla., has had the effect of waking up the old company. They have put in a new 2,000-light dynamo and will supply an all-night service. Heretofore the current was cut off at midnight.

Mayor Gilroy has approved the action of the New York Board of Aldermen in requesting the Park Commissioners to ask the Board of Estimate for an increase in the appropriation for electric lights in Central Park. As the Mayor is the chairman of the Board of Estimate, the application will probably be granted.

"The construction of electric railroads in the neighborhood of our property," says the annual report of the New York, New Haven and Hartford railroad, "continues throughout all its territory. Wherever they seriously reduce the revenue of this property we shall be compelled to lessen local service in a corresponding degree."

Rival trolley companies, the Schuylkill Traction Company and the Pottsville Traction Company, are eagerly seeking franchises in Pennsylvania coal region towns. The former has the leading streets at West Chester. The Pottsville company proposes to build a trolley road from Tamaqua to Pottsville, Minersville, St. Clair, Port Carbon, Frackville and Gilberton, making in all over 36 miles of electric railway.

The Mather Electric Company, of Manchester, Conn., report on hand a large number of contracts for their new multipolar railway generators for railway work. They have this week closed the following contracts: The Danbury and Bethel Horse Railway Company, of Danbury, Conn., for two 100 kilowatt multipolar railway generators, with very elaborate and complete switchboard, which will be fitted entirely with new Mather station instruments. The Chicago City Railway Company, Chicago, Ill., has ordered one 125 horse-power direct-connected generator.

THE ATLANTA CONVENTION.

THE STREET RAILWAY PEOPLE TO BE PRESENT IN LARGE NUMBERS—SPACE IN THE EXHIBITION HALL ALREADY AT A PREMIUM.

Mr. N. W. L. Brown, chairman of the Exhibits Committee of the American Street Railway Association, writes from Atlanta that a great extent of space at the exposition hall has been reserved by the enterprising exhibitors. Mr. Brown concludes: "From this you will see we are going to have the largest and most satisfactory exhibition and convention the Association has ever known." That is just what the ELECTRICAL REVIEW hopes to see. The warm-hearted people of Atlanta never do things by halves, and their hospitality is to be exerted this time in a way that will be memorable.

The railways of the East and West are getting up special parties and large delegations will go from all the leading cities. The most direct route from New York is on the train that leaves here at 4.30 P. M., Monday, October 15, on the Pennsylvania Railroad and the Southern Railway, arriving in Atlanta at 4 o'clock the next day. Other specials are announced, one over the Royal Blue, leaving New York at 3 P. M. Monday, and one over the Pennsylvania and Seaboard Air Line, leaving New York at 3.20 P. M. the same day. Those who desire to stop at Chattanooga on the return, in acceptance of the invitation extended by that city, can do so on either of the two first-named routes. If you have not secured your railroad accommodations, do so at once, and also write to Atlanta for hotel comforts. The names of the leading hotels were announced in the ELECTRICAL REVIEW last week. The Aragon will be the chief city headquarters. Everything will be out at the exposition grounds, where the meetings will be held and where exhibits will be exhibited.

The National School of Electricity.

[*From the New York Sun.*]

We understand that many of the most distinguished electricians in the country will render service in the National School of Electricity which has been organized and is to be established in this city. Mr. Edison has been chosen as Dean of the Faculty, among the members of which are qualified electricians like Tesla, Barrett, Carhart, Herdman, Anthony and others. If such men will serve as professors and directors in this school, it will surely become one of the great scientific institutions of the United States. Electricity is the light of the world at the close of the nineteenth century.

George D. Johnson, superintendent of the Hartford, Conn., Electric Company, died on September 20 of typhoid fever, aged 35 years. He was the father of "Little Ruby," the phenomenal child dancer.

TELEPHONE NEWS AND COMMENT.

A telephone line is to be erected between Coalville and Park City, Utah.

A new telephone line is being strung between Westbrook and Gorham, Me.

The new Union street exchange of the Providence, R. I., Telephone Company will soon be completed.

The Wayne Telephone Company, of Clyde, N. Y., are anxious to establish a telephone exchange in Palmyra, N. Y.

The Manufacturers' Association of Kings and Queens Counties, N. Y., is making a renewed effort for lower telephone rates in Brooklyn.

The Missouri and Kansas Telephone Company has asked St. Joseph, Mo., for a franchise to place all their wires and conductors under ground.

An agitation is in progress in favor of building a telephone line to Port Gibson, 40 miles distant from Vicksburg, Miss. If constructed it will be under the auspices of the Great Southern Telephone Company.

The New York and New Jersey Telephone Company has completed the laying of a new cable across the Kills between Elizabethport and Richmond County, Staten Island. The old cable was so badly damaged that it had to be taken up.

The American Bell Telephone Company's directors have declared a regular quarterly dividend of three per cent, and one and one-half per cent extra out of earnings of the first six months of the year. Payable October 15 to stockholders of record September 29.

By the way, what has become of the New York and Eastern Telephone and Telegraph Company that was going to do so much for Brooklyn, N. Y.? Have they filed that $25,000 bond yet and what is to become of those few house-top wires that have been strung?

The Lockport, N. Y., council has refused to renew the franchise of the Bell Telephone Company, of Buffalo, and on September 17 gave them 90 days in which to remove their plant from Lockport. There is a scheme on foot to form a new telephone company of the opposition kind.

The output of the American Bell Telephone Company for the month ending September 2, was as follows:

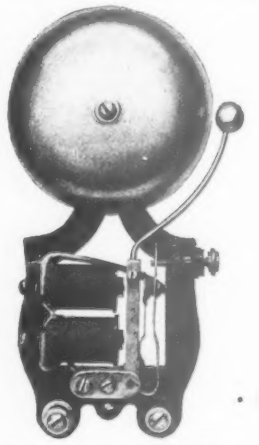
	1894	1893	Inc.	Dec.
Gross output,	9,234	8,535	5,699	....
Returned,	6,666	6,361	305	....
Net output,	2,568 def.	2,826	5,394	...
Since Dec. 20:				
Gross output,	62,378	67,162	....	4,784
Returned,	53,646	45,709	7,937	....
Net output,	8,732	21,453	....	12,721

An international telephone system to cover all Europe with its network is one of the latest movements to bring the nations into more intimate and more peaceful relations with each other. The cities of Amsterdam, Rotterdam, Brussels and Antwerp are already connected by telephone, and the extension of the lines is a question of only a little time.

There is going to be a little shakeup of the telephone numbers of some of the subscribers of the Metropolitan Telephone and Telegraph Company in New York city. The changes will only affect a few subscribers, and are caused by a reconstruction of the switchboard in the Cortlandt street central office. That office had formerly about 5,000 subscribers connected with it. New offices have been established in Broad and Franklin streets and about 1,000 names transferred to each from the Cortlandt street office. The few changes made are to secure more efficient service, and to avoid any embarrassment to subscribers they will not take effect until the new book is issued in October.

The Varley Bug-Proof Bell.

The race of bugs, which, according to nursery rhyme, was supposed to be happily domiciled in some convenient rug or rugs, has apparently died out or else unanimously canceled their lease on rug properties and moved to mansions higher up—on the wall. Any bell hanger who has gingerly jabbed bugs out of a bell and chased them out of annunciator cases will



VARLEY'S BUG-PROOF BELL.

readily concur in the supposed exodus. Of late years it has been the constant effort with manufacturers to construct a style of bell that would effectually bar these unwelcome tenants. But the bugs have always roosted around the cheerful blaze of the contact points just the same. In the Varley bell, which is illustrated herewith, this single vulnerable point has been ingeniously protected by a small elastic covering that completely encloses the solid platinum contacts, but does not in the least restrict the free vibration of the clapper. The bell being otherwise of the open frame construction, there are no inviting nooks where bugs will gather. The magnets are duplex wound and so arranged that the armature gets the full benefit of the "pull" and can be operated with much less battery than needed with an ordinary bell. All adjustment screws have lock nuts, so that they cannot work loose. It seems an admirably constructed bell in every way. The Central Electric Company, 173–175 Adams street, Chicago, are making it one of their specialties and report a very satisfactory demand from dealers who buy the better grades of electrical merchandise.

THE ELECTRIC BRAKE IN PRACTICE.

READ BEFORE THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, NEW YORK AND CHICAGO, SEPTEMBER 19, 1894, BY ELMER A. SPERRY.

(Continued from page 149.)

The effect of shifting the load in reference to the axles will be especially noticed in descending hills, as shown in Fig. 1, where the momentum of the rapidly retarded mass tends to shift the load centers still further forward, in some cases almost wholly, onto the front drivers. It will be seen to have a greater effect than in ascending grades, where, in stopping, the inertia tends to correct the position of the shifted load, whereas going down, in stopping, the momentum, as stated, tends to still further aggravate the condition. The practical effect of this may be seen whenever an ordinary street car mounted upon springs of fair resilience is quickly stopped. The car will be seen to suddenly right itself, having been pitched forward in the process of stopping (see Fig. 2), the front springs being depressed and the rear springs extended. These considerations all go to show, in a new light, the advantages to be derived from coupled drivers for general street railway service.

Bearing these facts in mind let us turn for an instant to the ordinary hand-brake. The ratio in the brake levers will be found in the modern trucks to be anywhere from six to 11½, averaging about eight and one-half to one. The lever arm of the brake staff will be found to be anywhere from six inches to 13 inches. Assuming 11 inches as the average, the radius from the center of the brake chain to the center of the brake staff will be one and three-fourth inches, giving thus 6.28 to one, or a total leverage of 53.4 to one from the operating handle to the brake beam. Two elements now have to be assumed. First, the friction coefficient of the brake shoes acting upon chilled wheels. Second, the power upon the brake staff. The writer has endeavored to cover both of these unknown quantities by actual experiment, giving the results in the tables. Table I was taken by a dynamometer being fastened directly to the brake staff handle in line of the pull of the motorman, a cast iron brake wheel 16 inches diameter from center to center of a one and one-fourth inch rim bearing the handle. A number of experienced motor men were invited to test their strength upon this handle and careful readings were taken. It was noticed that the right arm of the more experienced motor men was much more developed than the left, a fact which I think has been pointed out before. The extent of this development in the forearm is certainly quite marked, showing that the gripping muscles and weight of the body are the elements brought most into play.

TABLE I.

Number of motorman.	Weight of motorman.	Gradual pull with one hand.	Jerk with both hands on hand wheel.	Emergency jerk with both hands on hand wheel.
6	140	112	125	275
58	200	135	275	385
264	287	145	235	312
64	175	135	212	285
123	153	135	245	310
60	185	150	200	300
26	170	150	275	350
96	155	135	210	325
246	135	110	175	325
287	135	125	250	350
66	160	125	250	405
4*	176	100	200	400
266	185	175	250	375
		Av. 131.7	224	338.23

* Nine years in service.

Right arm, circumference of forearm, 12¾ in.
" " " biceps.. 14¼ "
Left arm, " " forearm, 11¾ "
" " " biceps... 13⅝ "

Columns one and two indicate, respectively, the number of the motorman and his weight.

Column 3 indicates the greatest possible steady pull with the right hand on the handle, bringing into play all possible weight of the body.

Column 4 indicates the same conditions as column 3, the motorman in this case grasping the hand wheel with both hands, some motormen using gloves to prevent their hands slipping. None of the men could maintain these values for more than one-half second.

In column 5 is indicated an "emergency stop." The motormen were told to "break the machine" if possible. In this test the body was braced, sometimes with the knee against the dasher rail, the needle registering the highest jerk usually given with a sudden lunge of the body.

It will be seen that the power applied by the steady pull of the average motorman is about 131.7, and can be made to run up in case both hands and the weight of the body are used, to about 224 average, but this value cannot be maintained. The average values of column 5 cannot be used in these calculations, for the reason that although they show the pressure it is possible to reach by jerking upon the hand wheel, these pressures cannot be maintained and, therefore, cannot be depended upon for braking effect. The tests show that the full power that can be maintained upon the brake lever for a sufficient length of time for the purposes in hand does not exceed an average of 180 pounds.

TABLE II.

Speed revolutions per minute, 33 inch wheel.	Brake pressure.	Traction.	Coefficient.
Varying, 150	900 lbs.	87.4 lbs.	9.7%
" 125	900 "	91.7 "	10.2%
" 100	900 "	99.8 "	11.1%
" 78	900 "	118. "	13.2%
" 56	900 "	133. "	14.8%
" 38	900 "	150.4 "	16.6%
" 20	900 "	154. "	17.1%
" 4	900 "	174.6 "	19.4%
Constant, 105	300 "	29.4 "	9.8%
"	500 "	50.5 "	10.1%
"	750 "	91. "	12.%
" 100	1,150 "	125. "	11.3%
"	1,500 "	178. "	12.%
"	2,200 "	305. "	14.4%
" 94	3,780 "	488. "	13.2%

Table II was obtained as shown in Fig. 3. A brake shoe that had been run in service about three or four days was taken with the axle carrying its co-operating wheel, lifted out of the truck and placed between the centers of a lathe, the load upon the brake shoe accurately measured, and the shoe held from movement around the wheel by a dynamometer. Every precaution was taken to avoid handling the periphery of the wheel or the face of the brake shoe, and even the dust was left upon it so as to conform as nearly as possible to the normal conditions of practice.

Tracing our 180 pounds application to the brake beam with allowance for loss by friction, we have 3,840 pounds applied to each of the two shoes which upon the chilled surfaces are found under ordinary circumstances by Table II to give a coefficient of about 12 per cent. This would give a retarding effect of 460 pounds, which is less than one-third that easily obtainable were the power needful for its application at hand. The coefficient under these conditions must have been about 37 per cent to realize anything like the total value of the retarding effect of the wheel. This under condition of chilled and glazed surface is entirely out of the question, showing at once the necessity of power in the application of brakes, if anything like their full value and use is to be obtained. This is also amply borne out in practice, as

those who have tested this point well know that under ordinary conditions it is next to impossible to slip the wheels of a motor car by the hand brake.

In the electric brake, on the other hand, the fact that the truck parts are not bound up and locked into a solid mass by the enormous pressures

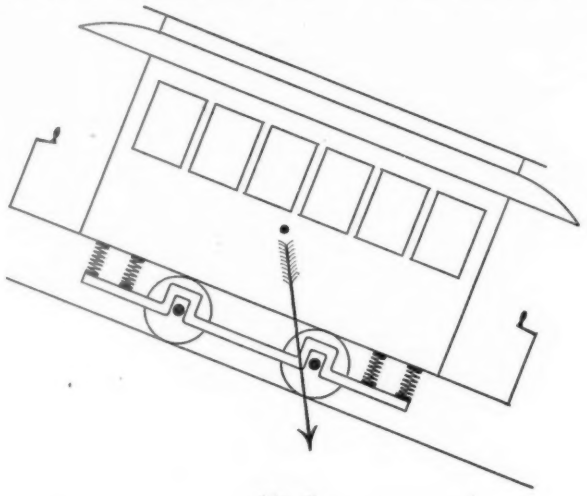


FIG. 1.

of the heavy brake levers and shoes is found to prevent racking and straining the truck as well as jumping the track and curves when the brakes are set. The axles and truck parts are perfectly free for easy and normal movement even when the brake is exerting its full power. Great reduction of wear at the pedestal journals is also found, owing to entire absence of all of the usual heavy pressures of the brake shoes. We can all see that by applying adequate power and control to the wheel brake, this element of the equipment may be raised to the position of an indispensable safeguard, the value of which can only be appreciated as its hitherto undeveloped resources are brought out, demonstrated, and rendered simple and

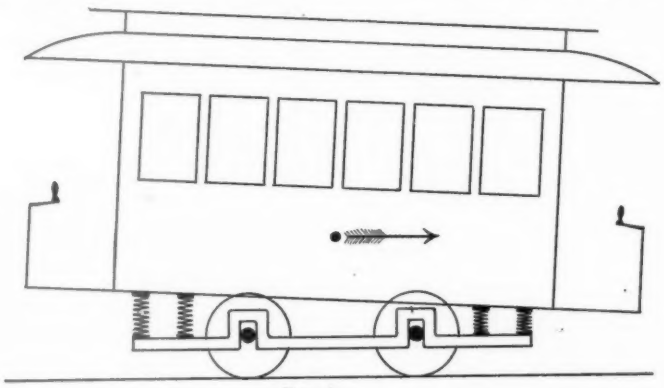


FIG. 2.

easy of application and control. In practice the greatest necessity for maximum brake application exits at the higher speeds. From Table II it will be noticed that at just this point the failure is greatest, the coefficients being least, increasing as the speeds decrease. This has always constituted the one grave fault of the air brake in railway service. The intensity of its application should be greatest when the speed is greatest, and decrease as the speed drops off. As will be shown further on, this point has been fully covered in the electric brake, which is the first time that the varying application has ever been embodied in practice, and especially in such a manner as to perform its important function automatically.

A plan, especially one pertaining to electrical matters, after having been proven mathematically to be feasible, is far from being realized. Many are the practical difficulties to be surmounted before a thoroughly commercial, or anything like a standard, apparatus has been produced. Especially is this true in the electrical field. Many subtle influences and energies are at work which well nigh overwhelm the experimenter. In a new field but few precedents are at hand, and these are apt to be extremely unreliable and in the nature of a blind leader of the blind. The practical application of the electrical brake, probably no exception to the general rule, amply illustrates the wide distance to be spanned between the conception of the idea and the commercial apparatus itself. For years the writer has believed that electricity was vastly preferable to any other force for the application and control of brakes. Working first on the solution of the continuous brake problem for railway trains, he built his first electric brake apparatus in '82 and has studied and experimented on the problem in its various phases almost continuously since that date, with more or less encouragement in the line of substantial progress. As to its application to electric cars, the apparatus was successfully applied on some double truck cars in Illinois, one of these cars weighing as much as 12 tons. The first equipment, similar to that shown in Fig. 4, was constructed some five years since. This apparatus has been constantly undergoing alterations and been experimented with, until for the past 18 months a constantly increasing number of electric cars, equipped with it, have been in regular service, some of them running with change of motormen on each of 13 daily trips, the same motorman having the car once in about three days, making it impossible for the men to become familiar with the operation of the brake. During this time one car has made upwards of 70,000 miles, hauling a trailer about 48,000 miles, during some special weeks of test, making from 178 to 220 miles daily. It is only under such rigorous conditions of actual operation that rapid progress can be made in reduction to practice. All machinery or apparatus must pass this ordeal successfully before it can be brought into thorough commercial shape.

At the mention of electric brakes the engineer at once admits that they should be entirely feasible, and usually adds that there is plenty of electrical energy at hand from the central station to retard and control as well as to propel the car. This, however, is not the method undertaken by the writer. To employ the central station current for operating the brakes would be to limit very materially their usefulness and certainty of operation. The braking current, although used at comparatively infrequent intervals, and then only for a short period, should for this reason be absolutely certain and unfailing in its action,

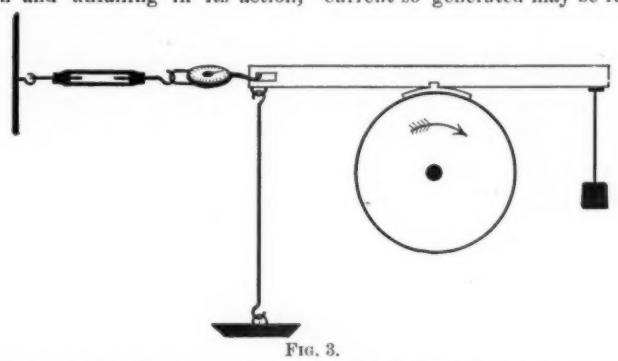


FIG. 3.

and not subject to any "heart failure" of the central station, or sudden cessation caused by the opening of the circuit breakers, the interruption of the line, the flying off of the trolley, failure of the fuse, or failure at other more or less vulnerable points. The electric brake under discussion has been operated over a year on equipment upon different roads, from electricity generated independently of the trolley connection, the braking current not being derived from the central station, but produced by the power of the moving car, which power it is desired to get rid of or destroy. The brake thus operates equally well with the trolley off, and, as will be understood from the following description, the trolley current has nothing at all to do with the car while the brake is being operated, except possibly to maintain the light circuit. The electric brake at the same time is entirely independent of the hand brakes, which may or may not be present upon the equipment. The braking action being altogether independent of the ordinary brake shoes, it is not found necessary to employ them in connection with the electric brake, although in the earlier forms they were used, and in the case of trail cars, especially in heavy service and on grades, some engineers prefer to use them at the present time, in connection with apparatus such as shown in Fig. 4. The current employed by the writer for operating the brakes is developed by automatically turning the motor or motors into generators. As these are driven forward by the moving car they develop current which is controlled as to intensity by the starting rheostat of the car. The braking current is thus produced at the expense of the mechanical energy stored up in the moving car, which, being consumed, causes a retardation and final stopping of the mass as a whole. The current so generated may be further-

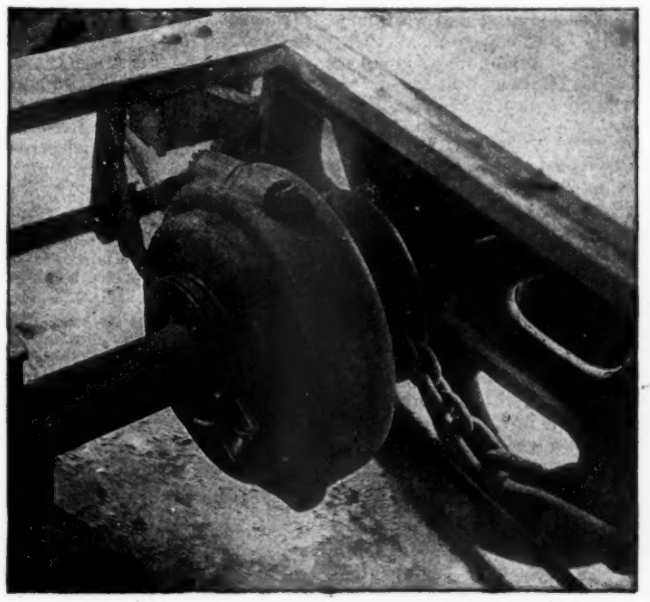


FIG. 4.

more led through a brake magnet as above seen, to apply the brake shoes; it may arrest the motion of the car direct by magnetic adhesion, or develop heavy retarding currents in the moving metallic mass by magneto induction. When an active local circuit is used the latter method is usually employed for reasons which will be made more apparent.

(To be continued.)

GENERAL NOTES.

Mr. N. W. Lillie, of Boston, purchasing agent of the New England Telephone and Telegraph Company, was a New York visitor last week and honored the ELECTRICAL REVIEW office with a call. Mr. Lillie is one of the hard and earnest workers in the electrical field and has a host of friends.

The Westinghouse Electric and Manufacturing Company has declared a regular quarterly preferred dividend of one and three-quarters per cent payable October 1 to stockholders of record September 22.

THE ANNUAL MEETING OF THE AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION.

THE MOST IMPORTANT FACTS CULLED FROM THE PROCEEDINGS.

BY DR. J. MOUNT BLEYER, OF NEW YORK.

[*Special for the Electrical Review.*]

The fourth of the annual assembling of the American Electro-Therapeutic Association has taken place at the Academy of Medicine. The time expended in serving up the yearly pent-up electrical storage lasted for three consecutive days — from the 25th to the 27th of September. The collation of this knowledge thus served up by the most prominent of its *savants* was in an *a la carte* style, rich in character, giving a savor about it of a high scientific class. Those who were fortunate enough to devour up this disseminated learning, it gave them no disturbances, gastronomically speaking, or otherwise. Most of the brochures, essays and demonstrations were conducted in a way befitting both the name of the society and its members. The scientific eye, ear and intellect could not discover by a critical analysis any flaws in their transactions. Surely, any one of the 48 Immortals of France would have taken delight in listening to their readings and discussions.

The medico-electrical exhibit connected with the session was extensive, as it was fine. Visitors streamed in and out in abundance. They composed mostly the medical and scientific fraternity, with their friends. Demonstrations were held by the inventors of the different apparatuses, and the manufacturers of the various noted electrical firms also lent a hand, making the entire affair most interesting and profitable.

It is no very good symptom, either of nations or individuals, that they deal much in vaticination. Happy men are full of the present, for its bounty suffices them; and wise men also, for its duties engage them. Our grand business undoubtedly is not to *see* what lies dimly at a distance, but to *do* what lies clearly at hand.

"Know'st thou yesterday, its aim and reason;
Work'st thou well *to-day*, for worthy things?
Calmly wait the morrow's hidden season,
Needn't not fear what hap soe'er it brings."

But man's "large discourse of reason" *will* look "before and after;" and, impatient of the "ignorant present time," will indulge in anticipation far more than profits him. Seldom can the unhappy be persuaded that the evil of the day is sufficient for it; and the ambitious will not be content with present splendor, but paints yet more glorious triumphs on the cloud-curtain of the future.

Our place is in the *new world*, our time in a *new age*. If we trace back but a little over one century we shall find that medical electricity was a new theme, and formed but a short, undefined and hence unimportant chapter in those works of systemic writers that treated of therapeutics. The Leyden jar was then but discovered; the physiological effects of the electric spark and shock was only surmised; our Dr. Franklin had not demonstrated to the world the actual identity between the lightning of the clouds and the electricity produced by friction. But only 150 years ago, and electricity, developed from rubbing smooth pieces of wax and glass, was the theme of universal wonder and of scientific investigation. The astonishing powers, laws and works of galvanism were utterly unsuspected. The relations of electricity to magnetism, and *vice versa*, remained yet hidden from the eyes of science for a long half century. Can we truly realize that water was then supposed by all the learned world to be a simple substance; that the laws of heat were unknown; that even the philosophers of 1760 did not dream of electricity as being the very *key* to physiology, to molecular physics and hence to metaphysics; for penetrating and revealing the intimate structure, relation and nature of bodies; that chemistry would be indebted to its subtle power for nice analysis and synthesis; for elucidating theories and for forming entirely new compounds; that the physiologist would have deduced by its aid a most intimate knowledge of and familiarity with those innate forces that hand and hand with *vitality* rule over living bodies and are next to the very mainspring of life itself; and, finally, that the physician and surgeon would find in it a very peculiar power for healing and restoring from a class of diseases that baffled all skill and were considered incurable? In electro-therapeutics of to-day the march of discovery is continually going on. Entirely new paths are opened; new methods of research and of doing things, new instruments to facilitate the work, new laws are evolved, giving connection and combination of facts and phenomena, which are unceasingly and increasingly accumulating around us. Electricity, of this hour, bridled for the fray, as it is in the hands of the modern physician and scientist, brings forth more ripened fruits.

The meeting was called to order promptly at 11 A. M. The president, Professor Herdman, of Ann Arbor University, delivered his address, "The Function of the American Electro-Therapeutic Association."

He began thus:

"A remarkable activity and interest seems to have been awakened in all that relates to electro-therapeutics since the organization of this association a few short years ago. It would be presumptious for us to claim that this is, in any considerable degree, the direct result of our efforts. On the contrary we may more rightly conclude that this association is but the natural crystallization from a medium that was already saturated with thoughts, facts and efforts, having a relationship to electro-therapeutics, but 'without form and void' until its advent.

"This association, wisely providing as it does for representation from other departments of electric research, affords a channel wherein the gradual erosion of these relics of former separation will naturally disappear in the efforts toward mutual understanding and greater simplicity, and uniformity in expression will result with wider comprehension of the truth.

"The times are ripe for the introduction of instruction in electro-therapeutics into the regular curriculum of all of our medical colleges. The medical educator can no longer afford to disregard the therapeutic value of a force that has been shown to influence animal organism and modify life processes in so many ways.

"This association has already done much to redeem the practice of electro-therapeutics from the neglect and contempt to which it has been subjected by many members of the medical profession."

This was followed by the reading of committees' reports on scientific questions—such as, on standard coils, standard meters, standard electro-static or influence machines, constant current generators and controllers, standard electrodes. This committee was composed of Dr. Wm. J. Morton, Dr. Cleves, Dr. Wm. J. Herdman and Dr. A. Lapthorn Smith. These reports were full, and much time and study was spent in their selection and testing.

The first paper of consequence was read by Mr. W. J. Jenks, M. A. I. E. E., New York—"Physics Current Distribution." Many valuable charts were used to illustrate his subject. He passed through the early history of the dynamo and its distribution of the current, and brought the subject matter up to the present time. Also touched upon the effects the various currents had upon the human body. Electrocution was taken into consideration. Proper contact was discussed. On the whole his essay was worth the time spent in listening to it. The discussion which followed was of much interest.

Prof. A. E. Dolbear, of Tufts' College, Boston, "Physiological Effects of the Constant Current," who said:

"At the outset it is needful to know whether electricity acts differently in a living body from what it does outside of it. It seems to be agreed that there is no such thing as a vital force, and that the effects of electricity are altogether physical and chemical. It is, therefore, needful to know what the physical and chemical effects are. First, a current heats the conductor, but the currents employed in therapeutics are very small, say a few milliamperes, and such currents would take two weeks to heat a pound of water one degree. Second, a current can produce light, but for this the incandescent lamp takes vastly more energy than is expended physiologically, and light is due to the incandescence of the molecules. Nothing of the sort can take place in physiological processes. Third, electricity can produce magnetism. A current of electricity in a conductor is a magnet itself and affects in one way or another every molecule in its field. Iron and other magnetic substances are set in certain positions. So-called non-magnetic substances tend to set themselves at right angles to the others. In other words, a magnet field, however produced, affects in some degree every molecule in it, and unless such phenomenon be different in the body from what they are out of it, every molecule in the body must be affected by a current of electricity and by a varying magnetic field. Experiments have been made to discover by sensation whether a magnetic field affects the body. None have been observed and it has been concluded that the field does not affect it. But it should be remembered that magnetism is an affair of atoms and molecules, not of organs as such, and one ought not to expect an effect upon organs as such. As for the brain, no one knows by sensation whether he is in a strong magnetic field or not, but the brain has no nerves of sensation in it; it may be dipped out with a spoon without sensation. Why should one expect to get sensation out of an insensitive organ? The question is, rather, will not currents of electricity in a nerve structure at some rate of alternations result in diminishing sensation, bringing anesthisea? Whether one's senses are really as acute with or without the electrical disturbance?

"Since Maxwell's work has been verified it is very sure that all atoms are magnets, for they are all able to set up electro-magnetic veins. This makes it pretty certain that the body itself is made up of an enormous number of atomic magnets and that ultimately all the physical and chemical phenomena in it are taking place in electrical and magnetic fields, and that the skill of the electro-therapeutist is properly directed to the fundamental properties of the elements themselves."

Perhaps one of the most valuable papers from a therapeutical and practical value was the one read by Dr. Wm. J. Morton, of New York, on "Metallic Electrolysis," "Cataphoresis," etc., with illustrated cases—such as trachoma, tinitus-aurium, vascular tumors, cysts, etc. The paper in its first part dealt with a historical review of some of the subject matter. In fact, the ground work was gone through so thoroughly that nothing was left wanting either scientifically or otherwise. His physiological experiments on cat muscular fibre are highly to be praised for its originality, and has thus gone far to prove the fact that metallic electrolysis is most valuable. He examined cat's muscle under the microscope while electric diffusion was being performed. By the aid of the microscope he watched the diffusion of the copper. In removing these deposited minute particles and testing them, they were found to give the reaction for copper. There is much in this paper worth further mentioning, but limited space does not permit. The paper is worth well digesting when printed in the entire form.

Dr. R. J. Nun, of Savannah, gave a full detailed report of a case of cancer. His paper bore the title: "Behavior of Cancer Under Mild Galvanic Currents." He remarked that there is no doubt that benign tumors can be absorbed to a greater or less extent through the influence of galvanic currents—although the manner in which the absorption is brought about is still debatable ground amongst the electro-therapists. But observations on the action of mild galvanic currents upon malignant tumors are sufficiently rare to induce him to place before the association the narrative of one case. The current strength used was from 100 to 150 milliamperes, applied daily in half hour sittings. The time occupied in getting favorable results was five months. The conclusion derived at was that such currents are highly beneficial in carcinoura of the breast.

Dr. Wm. J. Morton, of New York, gave a most interesting as well as a most learned demonstration of his *Static Induced Current*, contrasting it with those of D'Arsonval, Nikola Tesla and others. He plainly showed that 10 years ago he published and demonstrated facts upon which all others have built their experiments. To him, ther fore, we must look as the discoverer of these peculiar currents, in which the world's scientists at large interested themselves, and the many curious phenomena witnessed.

"Metallic Electrolysis," by M. le Docteur G. Gautier, of Paris, a paper which was read by proxy. The discussion was principally taken up by Dr. Geolet, its most ardent advocate in this country, and not without some right; he experimented much in that line at his clinic, which gives him abundant material for experience. Followed by Dr. Wm. J. Morton, who also had much to say of importance.

Dr. J. Mount Bleyer, of New York, gave an account of his method of electro-vibratory massage of the turbinated tissues of the nose. He treats most cases of hyperthrophic condition, or otherwise, said, all such suffering from swellings in the interior of the nose, due either from acute affections or chronic conditions. He places a metallic electrode into the affected nostril, and a faradic current going from 25,000 to 35,000 interrup-

Concluded on page 168.)

CANADIAN ELECTRICAL ASSOCIATION.

NEXT MEETING AT OTTAWA.

The fourth annual meeting of the Canadian Electrical Association was brought to a close at Montreal on September 21 after sessions extending over three days. It was decided to hold the next convention at Ottawa.

The officers elected for the ensuing year were as follows:

President—Mr. K. J. Dunstan, Toronto.

First vice-president—Mr. A. B. Smith, Toronto.

Second vice-president—Mr. J. Berkeley Powell, Ottawa.

Secretary-treasurer—Mr. C. H. Mortimer, Toronto.

Executive Committee—Messrs. Geo. Black, Hamilton; E. C. Breithaupt, Berlin; L. B. McFarlane, Montreal; T. R. Rosebrugh, Toronto; John Yule, Guelph; O. Higman, Ottawa; J. W. Taylor, Peterborough; D. A. Starr, Montreal; J. J. Wright, Toronto; and J. A. Kammerer, Ottawa.

A vote of thanks was accorded the Montreal Street Railway Company, the Montreal Park and Island Railway Company, the Packard Lamp Company, the Eugene F. Philips Electrical Works and the Bell Telephone Company.

This closed the business of the convention, the members of which then accepted the invitation of the Eugene F. Philips Electrical Works to a drive round Mount Royal Park, and on returning they paid a visit to the power house of the Montreal Street Railway Company. Mr. John Carroll, of the Eugene F. Philips Electrical Works, was indefatigable and ubiquitous in his attentions to the delegates.

The New Officers of the Old Timers.

The new presiden of the Old Time Telegraphers' Association, Edward Cromwell Cockey, is a native of Baltimore and belongs to one of the oldest and most distinguished Maryland families with a long record of aristocratic English ancestry and active service in the Colonial military service. Mr. Cockey served in the Baltimore Post Office for eight years prior to the War of the Rebellion, during which time he was in the governmental military service. Since 1867 he has been actively engaged in the telegraph business in New York in various positions of importance. He is a gentleman of rare administrative ability, genial and courtly manners and an eloquent public speaker. No better selection could have been made by the Old Timers. The new vice-president of the association, Richard James Hutchinson, is the superintendent of the New York Stock Exchange Telegraph. He is a native of New York and has been in continuous telegraphic service for more than 30 years.

STREET RAILWAYS.

CONVENTION ANNOUNCEMENT GIVING DATE AND PLACE OF MEETING.

AMERICAN STREET RAILWAY ASSOCIATION.—ATLANTA, OCTOBER 17.

Henry C. Payne, president, Milwaukee, Wis.; Wm. J. Richardson, secretary and treasurer, Brooklyn, N. Y.; W. J. Stephenson, first vice-president, Washington, D. C.; J. R. Chapman, second vice-president, Grand Rapids, Mich; Lewis Perrine, third vice-president, Trenton, N. J. Executive Committee, D. F. Longstreet, Denver, Col.; T. H. McLean, Indianapolis, Ind.; Ed. Whittacre, W. Y. Soper, Ottawa, Ont.; and E. S. Goodrich, Hartford, Conn.

Place of next meeting, Atlanta, Georgia, third Wednesday in October, 1894.

SUBJECTS FOR REPORTS AT ATLANTA.

"Can the T Rail be Satisfactorily Used in Paved Streets?" Joel Hurt, president Atlanta Consolidated Street Railway, Atlanta, Ga.; S. Hendrie, manager Wyandotte and Detroit River Railway, Detroit, Mich.; H. J. Crowley, engineer Atlanta Consolidated Street Railway, Atlanta, Ga.

"City and Suburban Electric Railways." E. C. Foster, superintendent Lynn and Boston Railroad, Boston, Mass.

"Mail, Express and Freight Service on Street Railways." R. McCulloch, electrical engineer Citizens' Railway, St. Louis.

"Best Method of Treating Accidents and Complaints." John B. Parsons, general manager West Chicago Street Railroad Company, Chicago.

"Street Car Wheels and Axles." D. S. Cook, electrical engineer Trenton Passenger Railway Company, Trenton, N. J.

"Transfer and Commutation." Rodney Curtis, president Denver Tramways Company, Denver, Col.

"T Rail Construction of the Terre Haute Street Railway Company, Terre Haute, Ind." M. F. Burke, superintendent Terre Haute Street Railway Company, Terre Haute, Ind.

"A Standard Form for Accounts for Street Railways." H. I. Bettis, consulting engineer Atlanta Consolidated Street Railway Company, Atlanta, Ga.

Racing by Electric Light.

[*From the N. Y. Evening Sun.*]

I went to Maspeth t'other night,
To see 'em race by 'lectric light;
An' 'pears like everything ye see
Down there goes by 'lectricity.

The jockeys looked like wooden boys,
The hosses jest like painted toys,
Which when the 'lectric knob was pressed
It started 'em an' did the rest.

There was a sort o' buzzin' sound,
An' then some black streaks scooted round;
They passed the wire so lightnin' fast
The fust hoss looked just like the last.

Oh, things went hummin', I tell you,
An' money went like lightnin', too;
For when it came to gettin' back
I had to walk the trolley track.

Right You Are, "Enterprise."

[*From the Barnesville, O., Enterprise.*]

The ELECTRICAL REVIEW, of New York, a journal that is at the head regarding electrical matters in this country.

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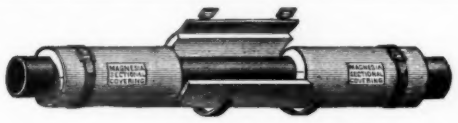

FIRE-PROOF.

MAGNESIA

SECTIONAL STEAM PIPE AND BOILER COVERINGS.

SELLING AGENTS:
New York, Robert A. Keasbey, 54 Warren St.
Boston, S. C. Nightingale & Childs, 134 Pearl St.
Philadelphia, Macan & Co., 1420 Callowhill St.
Baltimore, Wallace & Bro., 432 E. Pratt St.
Washington, Wm. B. Morgan, Builders' Exchange.
Chicago, Kemper & Walch, 208 Lake St.
New Orleans, Delbert Engineering Co.
Memphis, Symmes & Co., 196 Front St.

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MANUFACTURED BY
THE KEASBEY & MATTISON CO.,
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SELLING AGENTS:
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St. Louis, F. Bocler, 108 Walnut St.
Detroit, S. P. Conkling, 20 Atwater St., East.
Denver, C. W. Badgley & Co., 18th & Market Sts.
Salt Lake City, Utah & Montana Machinery Co.
Butte City, Mont., R. W. James.
San Francisco, DeSolla & Deussing, 2 California St.

THE AMERICAN ELECTRO-THERAPEUTIC ASSOCIATION.

(*Concluded from page 166.*)

tions per minute is allowed to pass for 10 minutes for 10 sittings. He gave a statistic of 200 cases treated at his clinic. Great part of this paper was taken up by giving the physiological action and physical explanations of faradic electricity.

Another paper of consequence was on "The Incandescent Electric Light or Radiant Heat Bath," by Dr. Kellogg, of Battle Creek, Michigan, who claims to have first constructed a bath of this kind, several of which he has had in use for the last three years. The bath is made in the form of a cabinet with 50 or 60 incandescent lamps arranged in rows inside, the spaces between the lamps being covered with glass mirrors. Other forms have been constructed for local application. Siemens showed in 1880 that the electric light promotes growth in plants, encourages development of chlorophyl, and the setting and ripening of fruits. Similar experiments with like results were previously made by Hervé-Mangon and Prillieux, and have been more recently repeated (1889–90) with identical results at the Cornell University Agricultural Station. Dr. Kellogg draws from these experiments the following general conclusions: 1. That the electric light is, qualitatively, fairly comparable to sunlight in its power to promote protoplasmic activity. 2. That it acts as a true vital stimulus, converting night into day for the plant, and counteracting the deleterious effects of artificial conditions, such as stove heat. To determine more exactly its physiological properties upon human beings and its therapeutic value, Dr. Kellogg has conducted in the Laboratory of Hygien, of Battle Creek Sanitarium, a series of experiments, the results of which he presented in tabulated form, and which justify the following conclusions.

1. The incandescent electric light bath increases the production of CO_2 and hence stimulates tissue metabolism. The amount of increase in a bath of 30 minutes duration was nearly 50 per cent (3.60% to 5.13%).
2. The urea and total chlorides were somewhat diminished by the bath, owing to the greatly increased activity of the skin.
3. Vigorous perspiration was induced at a temperature below that of the body (85° F.), and in half the time required to induce perspiration in a Turkish bath at 160° F. The action of the electric light is entirely independent of the temperature of the surrounding air.
4. The incandescent electric light bath possesses many advantages over the Turkish, Russian, vapor and hot-air baths, chief of which are: (1) The penetrating power of radiant heat, which is far superior to the convection heat of the baths mentioned; (2) the superior stimulating effect upon tissue metabolism; (3) the readiness with which perspiration may be induced when desirable (1 to 3 minutes); (4) the low temperature of the surrounding air, which permits the full effects of the bath; (5) the readiness and accuracy with which the dosage of the application may be regulated; (6) the wider range of application, which admits of the use of the bath for a tonic and sedative as well as alterative and spoliative effects.
5. The incandescent electric light is superior to the arc light for therapeutic purposes for the reason that it may be more readily and evenly distributed, and is free from the injurious effects which have been shown to result from too close proximity to the arc light.

The next paper was important from the point that humanity suffers much from this malady. Dr. Robert Newman, of New York, spoke on "The Successful Treatment of Urethral Strictures by Electrolysis," in which he gave a report of 1,755 successful cases by 54 different operators, all of whom vouch for the correctness of their statistics, which proves how widely practiced electrolysis is. He also brings forward proofs that the documentary evidences are correct, and some of these proofs are even sworn affidavits and signed and witnessed by notary publics and county clerks. Dr. Newman then gives the correct method of treating urethral strictures, which consists of "a correct diagnosis, gentle handling, causing no pain; and for the electrolysis, a galvanic battery, good electrodes, the negative electrode used at the stricture, weak currents, long intervals, using only one instrument at a seance and never to operate while the parts are in a state of acute inflammation." If operators were to use this method they would be more successful and electrolysis would not be a failure.

Dr. A. D. Rockwell, of New York, an old pioneer in electro-therapeutics, read on "The Action of Electricity on the Sympathetic." This was also a paper well being proud of. It dealt with physiological effects on the sympathetic, showing all kinds of phenomena from a diseased condition to a normal physiological one. Several cases were brought forward to prove that electricity is a valuable agent in the treatment of certain effections dependent on the sympathetic nerves. For instance, in exopthalmic goiter, where the author bases his conclusion on, from a practical point of view. In 45 consecutive cases, in which the results of electrical treatment were so pronounced that, admitting the disease to be dependent on sympathetic disturbance, there can be little question but that these results were in the main due to the action of the current upon the sympathetic.

"The Rapidly Undulating Currents of D'Arsonval" were the remarks of Dr. Kellogg. "D'Arsonval has succeeded in producing, by a modification of the method of Hertz, electrical undulations of one billion or more per second. The apparatus employed is a form of transformer which may be used either with a powerful induction coil or with a static machine." Having secured one of these transformers Dr. Kellogg has been studying its effects during the last few months by means of physiological experiments, employing as the source of current a powerful static machine constructed by Waite & Bartlett, of New York, having six revolving plates, each 52 inches in diameter. The current thus obtained produces a marked increase in CO_2 production, and generates ozone in large quantity, but is painless in its application. "The observations which I have made lead me to believe that this current, as well as that of Tesla, which is apparently identical, is possessed of therapeutic properties in some respects greatly superior to those of ordinary static electricity, and similar to those of the electric wind and the electric charge."

Following Dr. Kellogg was another by Charles R. Dickson, of Toronto, Canada: "Notes on Goiter and Improvements in the Apparatus for the Treatment of Same." The varying character of reports on electrical treatment of goiter in the past prompted an investigation to verify an opinion formed many years ago that for the local treatment of goiter, electricity properly and rationally employed by competent operators should prove more efficacious, more safe and more acceptable than any other agent, and that its value had been greatly underestimated.

The paper is the third in a series presented to the association and embodies many deductions.

From a year's further experience in Toronto General Hospital and St. John's Hospital he had occasion to make accurate diagnosis of his cases which he deemed paramount, and next, discrimination must be exercised and strict antisepsis adhered to. In hyperæmic cases when not present galvanization of the sympathetic is all that is necessary.

Slight hyperplesia requires the same treatment, or should this fail, tried gradually increased currents by means of flexible electrodes accurately moulded to the parts. Negative pole on goiter, positive on shoulder, about 50 M. A. for 10 minutes; five times weekly. Should this strength of current be ineffectual, 100 M. A. to 150 M. A. must replace the milder.

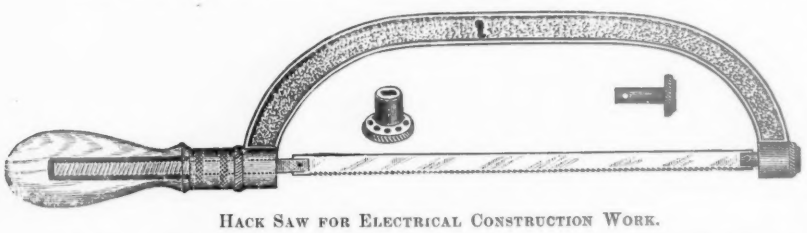
The vascular forms are best treated with punctures into the substance of the goiter. Platinum needles is the guiding poles for the positive side and a pad for the negative placed on the back of the subject. The strength of the current is from 50 to M. A. to 120 M. A. for 10 minutes every three to 10 days. The rational of this treatment, or rather say the aim of the operator, is to cut off excessive vascular supply and thus cause atrophy of the gland.

The Fibroid forms, which resist other treatment, often yield to positive puncture and occasionally the negative.

He further spoke at length of other forms of goiter and laid out a similar procedure.

Papers by Elihu Thomson, Prof. Houston, Newman Laurence, M. I. E. E., London; A. E. Kennelly, F. R. A. S.; and several others, were interlaced among the many. The above named papers will appear later.

Mr. Nikola Tesla received the members of the association at his laboratory, where many of his experiments were again demonstrated.



Hack Saw for Electrical Construction Work.

ELECTROCUTION A SURE AND PAINLESS DEATH.

Prof. Edwin Houston gave an elaborate experimental discourse on the effects of the alternating current on dogs. These experiments were made in conjunction with A. E. Kennelly, at their laboratory. Several well-known Philadelphia specialists in different departments of medicine aided them to establish such facts, which may be beyond an electrical engineer. These studies were carried out in order to disprove D'Arsonval's recent assertion regarding the possibility of resuscitation after death from electrocution in this country. The number of four dogs furnished the experimenters with the material for making their observations; all impossibilities were excluded. In all these animals, after electrocution by the alternating current, some with higher and lower number of alternations which they were subjected to, remained dead. Resuscitation was practiced by experienced physicians and not one survived its effects. Dr. D'Arsonval's theory, then with one case on record, which occurred recently in Paris, was very much disproved by them. Post-mortem examination showed that positive death took place in a few seconds after the passage of the current.

The discussion was a red hot one, mostly siding with our Houston and Kennelly, so they scored a decided scientific success, and well they deserved it. They based their work upon such careful scientific basis and excluded every possible mistake to establish the correct truth. Accordingly electrocution is a painless and sure death to all who are so unfortunate as to be killed by the alternating current.

(*To be concluded.*)

A Handy Hack Saw.

Electric construction companies will be interested in the hack saw illustrated herewith. It is supplied by Samuel Babcock, of Elmira, N. Y., and is made in two sizes and three styles. It has the improved "J. E. C." frame, a strong ribbed back and polished hard wood handle. By simply turning the thumb screw on the shank of the frame the saw can be instantly adjusted to eight different positions. The long screw running through the handle permits short or broken blades to be used. The smaller size uses blades from six to nine inches long and the larger size uses blades nine to twelve inches long.

The Metropolitan Telephone Company, 18 Cortlandt St., now offers a new rate to small users—physicians, residences, private stables, &c.—$100 to $150 per year, according to use. Full long-distance equipment.

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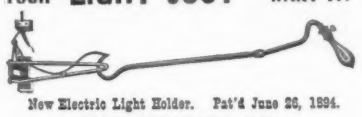

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